Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

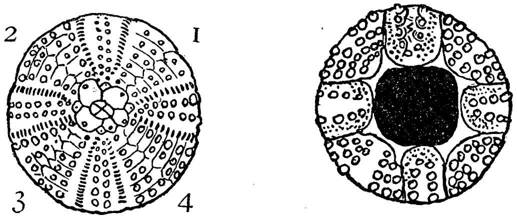
BRIEFER ARTICLES.

A CASE OF VARIATION IN THE NUMBER OF AMBULACRAL SYSTEMS OF ARBACIA PUNCTULATA.

HENRY L. OSBORN.

THE growing interest in variation, stimulated by the appearance of Bateson's [1] work on that subject, seems to make it worth while to record cases of variation even where they are isolated, and it is for this reason that I make the following record. The specimen is the only one thus far met with in the course of several years in using Arbacia and Strongylocentrotus, so that it can be regarded as rare. The number of Arbacias that have passed through my hands cannot be less than two hundred, and of Strongylocentrotus, not less than twice that number, and I have not before met a case in which the number of ambulacral systems was less or more than five. I was, therefore, somewhat surprised when a student presented me with a drawing of an Arbacia in which the number was four, and at first was inclined to doubt the accuracy of the work; but the specimen itself was placed in my hands and showed that this departure from the typical number does occur in this species.

The specimen came to me dried. It came from Woods Holl in a lot of supplies furnished by Mr. W. H. Walmsley, and the position of the soft parts can only be inferred from the test, which, however, is fairly indicative of the internal anatomy in this class of animals. Two views of the test are shown in the accompanying cut. That of



Aboral and oral aspects of a four-rayed individual of Arbacia punctulata from the coast of Massachusetts.

---

[1] *Materials for the Study of Variation.* Macmillan, 1894.

the oral surface is perfectly four-rayed instead of five. Four perfect ambulacral rows alternate with four perfect inter-ambulacral rows. On the aboral side, too, the ambulacral rows are completely four-rayed instead of five-rayed. The lantern, too, is completely four and not five-parted; its relation to the peristome membrane is apparently the same as in the normal cases. But a break in the four-rayed plan occurs in the aboral ring of bones. In this ring there are three large genital bones which terminate rows numbered 1, 2, and 3 of the figure, No. 1 being the madreporic plate; but the fourth row is terminated by two smaller genital bones, each perforated for the opening of the genital duct. One of these bones is at the summit of one of the two rows of bones in the inter-ambulacral area, and the other is at the summit of its mate. There are, however, only four instead of the normal five ocular plates. The position of the anal plates is normal, *i.e.*, there are four, and the plane between two passes through the madreporic plate at the summit of area No. 1. The test as a whole is entirely symmetrical, and the variation is not betrayed by any even slight loss of symmetry; the outline is quadrilateral, not pentagonal as usual.

It seems from the study of the test that what has happened has been the failure of one entire ambulacral system to appear, that is, two ambulacral rows of bones and the neighboring inter-ambulacrals on each side have not developed at all, while as a consequence the inter-ambulacrals of two rows, *viz.*, that on the left side of row No. 4 and that on the right side of row No. 5, have been matched together, so that row marked actually No. 4 is really a part of row No. 4 and a part of row No. 5, the balance of each having been suppressed so early that there is no trace of them left. The apical organs, however, were not included in this suppression, and hence the genital plates, and presumably the reproductive organs as well, are in fives.

This case does not exactly correspond with any of the cases cited by Bateson (pp. 443 *et seq.*), for his list does not provide for a case in which there is a total variation to a four-rayed form in the ambulacrals and inter-ambulacrals, and perfect symmetry among these parts, and at the same time only partial approach to the four-rayed form in the apical system. His case No. 676 (p. 441) is totally four-parted, and there are four genitals and four oculars, and case No. 677 also has the apical system, as well as the ambulacrals four-parted. The only cases of partial meristic variation which he gives are those in which some of the ambulacral systems are partly subdivided by the intercalation of some of the missing bones. The presence of the five genitals makes it possible to conclude that in this case the missing ambulacral row (using the nomenclature of Lang, *Comp. Anat.*, vol. ii, p. 321, Macmillan, 1896) is the right posterior one.

Biological Laboratory of Hamline University,
St. Paul, Minn., February 1, 1898.

RELATIONSHIP OF THE CHRIACIDÆ TO THE PRIMATES.

CHARLES EARLE.

It would be interesting if some especially clear-headed paleontologist would define the order Creodonta and explain how it is to be separated from the Insectivora. If we include forms like Chriacus in the Creodonta, we shall be obliged to follow Wortman's suggestion and unite the creodonts and insectivores in one common group.

It must be granted that the creodonts of the Puerco were well differentiated and somewhat specialized; this is proven by the presence of such forms as Deltatherium and Didymictis, the latter genus having developed already the true sectorials of the higher carnivores. It remains to be shown whether the peculiar upper molars of the Mesonychidæ are primitive or degenerate. If Dissacus is really the ancestor of Mesonyx, then this series illustrates an important point in tooth morphology, and would help to settle the vexed question whether the order of appearance of the cusps of the true molars is really different from that of the premolars. In Dissacus and Pachyæna, for example, one would be led to conclude that the antero-external cusp of the upper molars was the first one to appear and its position had not been changed. In the case of these teeth it is hard to believe that there had been any rotation inwards of the protocone such as the advocates of the triconodont-tritubercular theory would make us believe.

The genus Chriacus and its allies have little in common with the above-mentioned creodonts, and I fail to see why they should be classified with them. It appears to me to be out of the question to imagine that the primates have any close relationship to the Condylarthra such as Cope supposed. That the condylarths were all ungulate types has been admitted, and, in fact, it is one of their important diagnostic characters that they were hoofed quadrupeds.

It has been most interestingly shown by Dr. W. D. Matthew how closely one of the earliest condylarths, Euprotogonia, approaches in